MEMOIR

OF

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HENRY JACOB BIGELOW.

HENRY JACOB BIGELOW was born in Boston, March 11, 1818, and died in Newton, Mass., October 30, 1890. He was the oldest of five children of Jacob and Mary (Scollay) Bigelow. His father was distinguished in various branches of science and literature; he was a former President of the Massachusetts Medical Society, and a President of this Academy; a man of great ability, a leading practitioner in Boston during his long life, and especially memorable as the founder of Mount Auburn, the earliest of our garden cemeteries. His son inherited many of his father's qualities. After attending Mr. Thayer's school, which he entered in 1826, he joined the Latin School, then under the charge of Mr. Leverett. When Mr. Leverett left the Latin School and established one of his own, he followed his instructor, having among his schoolmates William M. Evarts and William W. Greenough. He entered Harvard College in 1833, graduating in 1837. "If he does not become a distinguished man," Dr. James Jackson is reported to have said of him, "it will be because Boston is not a large enough field for his ability."

Mr. Henry Lee writes an interesting account of the early years he and Henry Bigelow passed together, from the age of three until Mr. Lee left to go to college, a year before his companion. He describes his young friend as a slender boy, lithe and active, a good gymnast and dancer, and full of contrivances and ideas of all sorts. He had a

rather remarkable facility for mechanical work, — took early to shooting, a taste which lasted to the later years of his life; he was also fond of bird's-nesting, with the usual knowledge, or rather more, of birds and their haunts and habits; like his father, he had a taste for botany, which came again very strongly in his later years. He was a fair though not remarkable scholar, through school and college.

He early showed his independence of character. There was a rebellion while he was in college, and anxious parents went out to look after their sons, — among them Dr. Jacob Bigelow, who remonstrated with Henry. The latter reminded him that there was a rebellion in his own day. "Yes," said his father, "but I have seen the folly of it." "Well, I want to see the folly of it too," was Henry's (characteristic) answer.

He graduated with respectable rank in 1837. After leaving college he had threatening symptoms of pulmonary disease, for which he went to Havana; but he was able to continue the study of medicine which he had already commenced, in the prosecution of which he went to Europe, passing his time chiefly in Paris, visiting London, more especially to hear the lectures of Sir James Paget. He took his medical degree at Harvard University in 1841, and entered upon practice in Boston. He had determined to devote himself to surgery, and soon found himself in active business.

In connection with Dr. Henry Bryant, he established a kind of surgical dispensary, which was the subject of no little comment and some harmless satire from unknown rivals, which amused him and his friends as much as it did any of the medical community.

He soon became known as an enterprising and aspiring practitioner, who was mapping out his own path, deterred by no fear of rivals, and not afraid of his critics.

First on the list of Dr. Bigelow's published writings stands a "Manual of Orthopedic Surgery," being a Boylston Prize Dissertation for the year 1844.

The Boylston Prize Fund was provided by the generosity of Ward Nicholas Boylston, a Boston merchant. Its two annual prizes of fifty dollars each invited the competition of the younger members of the medical profession, and the gaining of them was a favorable introduction of the young practitioner to the medical world and the general public. The question, or one of the questions, for the year 1844 was the following: "In what cases, and to what extent, is the division of muscles, tendons, or other parts, proper for the relief of deformity or lameness?" Dr. Bigelow did not confine himself

strictly within the limits of the question, but extended his labor until it took the form of the Manual above mentioned, an octavo volume of more than two hundred pages. This was a systematic and lucid treatise, far beyond the ordinary standard of the annual dissertations in scope and completeness.

For more than thirty years — from 1849 to 1882 — he was Professor of Surgery in the Medical School of Harvard University. In 1847 he was appointed one of the surgeons to the Massachusetts General Hospital. During all this active period of his life, he published many important papers, bearing more especially upon, but not confined to, surgical practice. The following list is furnished by Dr. R. H. Fitz, at the close of his tribute to Dr. Bigelow at the memorial meeting of the Society for Medical Improvement.

A List of some of the more important of Dr. Bigelow's Contributions to Medical Literature.

Manual of Orthopedic Surgery. Boylston Prize Dissertation. 1845.

Fragments of Medical Science and Art. An Address delivered before the Boylston Medical Society. 1846.

Insensibility during Surgical Operations produced by Inhalation. Boston Medical and Surgical Journal. 1846.

On a New Physical Sign, a Clicking in the Throat. Boston Medical and Surgical Journal. 1847.

Anæsthetic Agents, their Mode of Exhibition and Physiological Effects. Transactions of American Medical Association. 1848.

Ether and Chloroform: a Compendium of their History, Surgical Use, Dangers, and Discovery. 1848.

On the Employment of a New Agent in the Treatment of Stricture of the Urethra. Boston Medical and Surgical Journal. 1849.

An Introductory Lecture. 1849.

Dr. Harlow's Case of Crowbar Injury to the Head. Philadelphia Medical Journal. 1850.

Notes from Clinical Lectures on Surgery. 1851.

Science and Success. A Valedictory Address. 1859.

Surgical Cases and Comments. Boston Medical and Surgical Journal. 1864.

Rhigolene, a Petroleum Naphtha for producing Anæsthesia by Freezing. Boston Medical and Surgical Journal. 1866.

New and Successful Operation for Ununited Fractures, with Cases. Boston Medical and Surgical Journal. 1867.

Nitrous Oxide Gas for Surgical Purposes in 1848. Boston Medical and Surgical Journal. 1868.

The Mechanism of Dislocation and Fracture of the Hip. Boston. 1869.

Medical Education in America. Address before the Massachusetts Medical Society. 1871.

Death by Chloroform and alleged Death by Ether. Boston Medical and Surgical Journal. 1872.

Alleged Death from Ether. Letter to the Editor of the British Medical Journal. Boston Medical and Surgical Journal. 1873.

Turbinated Corpora Cavernosa. Boston Medical and Surgical Journal. 1875.

The True Neck of the Femur: its Structure and Pathology. Boston Medical and Surgical Journal. 1875.

A History of the Discovery of Modern Anæsthesia: a Century of American Medicine. Philadelphia. 1876.

New Methods and Treatment of Extrophy of the Bladder and Erectile Tumors. Boston Medical and Surgical Journal. 1876.

Lithotrity by a Single Operation. American Journal of Medical Sciences. 1878. Boston Medical and Surgical Journal. 1878.

Rapid Lithotrity with Evacuation. 1878.

Litholapaxy. New York Medical Record. 1879.

Litholapaxy. Boston Medical and Surgical Journal. 1879.

Litholapaxy. Letter to the London Lancet. Boston Medical and Surgical Journal. 1879.

Litholapaxy: an Improved Evacuator. Boston Medical and Surgical Journal. 1880.

The Code of Ethics adopted by the Massachusetts Medical Society. A Minority Report. Boston Medical and Surgical Journal. 1880.

Remarks on Modern Lithotrity. Lancet. 1881.

Radical Cure of Umbilical Hernia. Boston Medical and Surgical Journal. 1882.

A Case of Disease of the Liver. 1882.

Lithotrity with Evacuation. 1882.

A Simplified Evacuator for Litholapaxy. Boston Medical and Surgical Journal. 1883.

A Radical Cure for Umbilical Hernia. Boston Medical and Surgical Journal. 1889.

Fees in Hospitals. Boston Medical and Surgical Journal. 1889.

An Old Portrait of a Surgeon. Boston Medical and Surgical Journal. 1889.

The second publication on the list is entitled "Fragments of Medical Science and Art." Under this head is printed "An Address delivered in 1846."

The great aim of this essay is to show the importance of the imagination in science. The "Numerical Method" of Louis was at that time looked up to, by the more ardent disciples of that admirable observer and teacher, as the master-key which was to unlock all the

secrets of disease and its remedies. Observe all the facts in a case, in a hundred or a thousand cases; tabulate them, add, subtract, multiply, divide them, and the laws of pathology and therapeutics will come out in your sums and quotients as inevitably as a clerk's balance at the end of his account-book. Dr. Elisha Bartlett's "Philosophy of Medical Science," published in 1844, presented the Numerical Method in a form which might be thought to exclude the imaginative element, and reduce the man of science to a mere statistician.

Dr. Bigelow's essay was a vindication of the true office and the importance of hypothesis. To illustrate his argument, he appealed to the history of great discoverers and inventors, of Copernicus, of Kepler, of Newton. "I am aware," he says, "that this position, namely, that hypothesis is essential to the discovery of scientific truth, is not recognized by many philosophers, especially in medical science of the present day. Bacon himself, feeling that unfounded theory, gratuitous assertion, had been a stumbling-block to all preceding science, was led to attaching too exclusive value to facts. 'We must not imagine or invent,' he says, 'but discover the acts and properties of nature.'"

In the face of Bacon's proposition, in the presence of the champions of the statistical school of observers, Dr. Bigelow maintained effectively and convincingly the true office of that higher faculty, which, instead of counting columns of figures, sees, in virtue of its special gift of insight, the hidden relations between a few facts remote from one another to all appearance, but which, connected by an hypothesis, are often verified by large observation, and become a part of accepted knowledge or true science.

It was not so much the originality of the thesis maintained by Dr. Bigelow as the reasonable and forcible method by which he expounded and illustrated it, and the peculiar fitness of his choice of a subject at that particular time. He knew when to strike, as well as how to strike. One of the most distinguished of our Boston practitioners said to me that he almost regretted Dr. Bigelow's having given so much time to special practical points, instead of applying himself to the larger problems of medical philosophy. I would not go so far as that, remembering how much he accomplished in the improvement of mechanical surgery, and the amount of human suffering which his inventive genius has relieved; but, after reading this essay, one may be pardoned for regretting that so good a thinker and reasoner was willing to allow his skilful handiwork to usurp so large a portion of his time and labor.

Had Dr. Bigelow left no other record, the association of his name with the great inventive discovery of artificial anæsthesia would preserve his memory to the latest period of civilization. On the evening of November 2, 1846, he called at my house in Charles Street with a paper which he proposed reading at the meeting of the American Academy of Arts and Sciences, to be held the next day, and which he wished me to hear. He began by telling me of the successful use of the inhalation of a gas or vapor which produced insensibility, during which a capital operation had been performed at the Massachusetts General Hospital. He was in a state of excitement as he spoke of the great discovery that the gravest operations could be performed without the patient's knowing anything about it until it was all over. In a fortnight, the news of this wonderful discovery, he said, will be all over Europe. He then proceeded to read to me the paper he had prepared, — the first formal presentation of the subject to the scientific world. The following is the official report, copied from the records of the Academy: —

"November 3d, 1846.

"Dr. Henry J. Bigelow read a paper giving some account of the new method of inhalation employed by Dr. Morton of this city to produce insensibility to pain during the performance of operations by the dentist and the surgeon."

No person took hold of Dr. Morton's discovery with such far-seeing, almost prophetic appreciation as the young surgeon who had been but a few years in practice, and who threw all the energy and ardor of his early manhood into his advocacy of the new and startling innovation which was destined to change the whole aspect of surgery. It was not merely by his sagacious foresight that he recognized the importance of this epoch-making novelty, but throughout its subsequent history, until its universal acceptance, he was the foremost champion of the claims of artificial anæsthesia. After the use of chloroform was introduced Dr. Bigelow remained faithful to the original anæsthetic agent, and was always ready to battle in the cause of ether as against chloroform, which, though more convenient, and in many cases useful, is a more dangerous agent than the other. His writings on this subject extend through a period of thirty years, from 1846 to 1876.

In the year 1850 Dr. Bigelow published a remarkable article on a case which may be considered on the whole as the most extraordinary in the annals of surgical injury. This was the famous "crowbar

case," the account of which seemed to many incredible, and its mechanism beyond explanation. The story was briefly this. A man was ramming down a charge of powder in a hole drilled in a rock, when the charge exploded, and the tamping iron — a short round bar — was driven up through the side of his face, out at the top of his head, breaking upward through the top of his skull as if it had been pie-crust, shooting up into the air, and falling at some distance. Dr. Bigelow accepted the story as true, and undertook to show how the bar could have found its way up and out through the bones of the face and skull, traversing the brain, and cutting one of the optic nerves on its way. He prepared a skull to illustrate the course taken by the implement. The subject of this extraordinary accident lived many years, but an opportunity was found to inspect the injured parts after death, and Dr. Bigelow's explanation of the accident was fully confirmed.

In the midst of his scientific researches Dr. Bigelow never forgot the practical aim and end of the healing art. He cared quite as much for "common sense" in a medical man as he did for scientific acquirements; indeed, he rather undervalued pure science as compared with practical skill. His lectures are eminently practical, and most of his scientific researches tend to some important curative purpose. No man knew better than he what were the needs, and what should be the training, of the young practitioner who would make his way in the world; and his Lecture on "Science and Success" gives some of the best results of his wise experience.

In 1869 he published his essay, "The Mechanism of Dislocation and Fracture of the Hip." This subject had been long and diligently studied by the great surgeons of the past, more especially by Sir Astley Cooper. Dr. Bigelow threw new light upon the whole matter. I have requested Dr. Richard M. Hodges, who knew the history of Dr. Bigelow's researches more intimately than any other of his pupils and assistants, to make a brief statement of the leading points of his doctrine and practice in dislocations of the hip. The following is his answer to my request: —

"*Hip Dislocations.* — Although Winslow and Weitbrecht had described the two fasciculi of the ilio-femoral ligament, or ligament of Bertin, Dr. Bigelow first drew attention to the great strength of the anterior part of the capsule of the hipjoint, and defined with precision the two bands of the abovenamed ligament, diverging like the branches of an inverted Y.

"Dr. Bigelow showed that, so long as it remained unbroken in one

or both of its branches, the Y ligament dominated all the dislocations of the hip joint with established features, and that it was the chief obstacle to reduction; the muscles playing only a subordinate and occasional part in giving position to the limb, or in hindering the reduction.

"Dr. Bigelow classified dislocations of the hip into regular and irregular.

"The regular dislocations, seven in number (four of them being new varieties), are those in which, one or both branches of the Y ligament being unbroken, the head of the femur is thereby held near the acetabulum, and their signs are constant.

"The irregular dislocations are those in which the Y ligament is wholly ruptured, and they therefore offer no constant signs. The head of the femur, being loosed from the acetabulum, is free to go anywhere.

"In the regular dislocations, manipulation of the Y ligament will alone effect reduction.

"The principle of this manipulation is flexion, which is efficient because it relaxes the Y ligament.

"The Y ligament being flexed, and therefore relaxed, the head of the femur is drawn or forced into the desired direction by 'traction,' which disengages it from behind the acetabulum and directs it toward the socket, — or by 'rotation,' which winds the Y ligament around the neck of the bone and so shortens it, thus compelling the head of the femur, as it sweeps around the acetabulum, also to approach the socket, into which it can be easily lifted.

"Dr. Bigelow converted random, ill devised, and fruitless movements into accurately conceived, instructed, and well directed manipulation."

Growing out of his investigations of this subject was his original study of the anatomical neck of the femur. By a series of parallel sections through the head and neck of the bone, he demonstrated the column or lamina of condensed bone in the midst of the cancellated tissue forming a line of support rendered necessary by the obliquity of the neck of the bone.

In 1878 Dr. Bigelow published his essay, "Lithotrity by a Single Operation," of which Dr. Hodges speaks as follows: —

"*Rapid Lithotrity with Evacuation at a single sitting; or Lithola-paxy.* — The normal urethra having been shown to admit instruments of greater size than surgeons had previously supposed possible, Dr. Bigelow constructed a lithotrite, improved in many of its details,

(especially by devices which prevent the blades from clogging or becoming impacted with crushed material,) of a size much larger than had before been used. This permitted the attack of calculi exceeding in dimensions the limits previously thought allowable by crushing alone, i. e. without evacuation.

"Dr. Bigelow also constructed thin silver tubes, easy to be introduced, notwithstanding their large size (27–31 Charrière), through which evacuation of the crushed stone was made practicable by means of an elastic exhausting bulb of sufficient suction power to draw out the fragments previously comminuted to a size enabling them to enter and pass through the tube, — pulverization being no longer essential.

"Dr. Bigelow established the fact that with these instruments a sitting — two minutes having been, up to that time, assigned by Sir Henry Thompson as the proper average duration — could be prolonged, with the aid of anæsthesia, one to two hours, harmlessly for the patient and without detriment to the bladder. 'Lithotrity with a single sitting' has been shown to have a mortality less than that of 'Lithotrity with many sittings,' and it has entirely superseded the latter.

"The operation of Litholapaxy, at first supposed applicable only to adults, has been within the last few years extended in its use to children from two years of age upwards, with great success. They have never been supposed to come within the scope of old-fashioned lithotrity. This practice, adopted originally in India (Lahore), has latterly been introduced in England and America.

"Dr. Bigelow's invention may justly be said to have acquired a world-wide reputation."

I add a few words to this description by Dr. Hodges. He was led to think that a principal source of failure in that operation was the irritating effect of the fragments of stone allowed to remain in the bladder, which left it inflamed and sensitive, not in condition to be the subject of a second or third operation. If the bladder could be completely cleared at one sitting, this danger could be avoided. To effect this object, he designed new instruments, or modified such as were in use, so as to make them serve his purpose. He spared no pains in perfecting his apparatus. It is not to be supposed that his surgical innovations were at once accepted without question or opposition. The end of it all was, that his principal rival in the treatment of calculus, Sir Henry Thompson, became a convert to Dr. Bigelow's mode of dealing with stone in the bladder, and that this new method of opera-

tion is generally recognized as one of the great improvements of modern surgery. I myself had the opportunity of observing some of his experiments, and well remember the patient and persevering labor they involved. I recollect, more especially, the pains he took in getting plaster casts of the bladder and the urethra, and I learn from others that he bestowed the same care upon the instruments he contrived or adapted for the rapid removal of a calculus, by the method to which he gave the name of Litholapaxy.

Among Dr. Bigelow's other professional labors, I may mention his suggestion of a new refrigerant for producing local anæsthesia. This was brought forward in an article published in the Boston Medical and Surgical Journal, in 1866, under the title, "Rhigolene, a Petroleum Naphtha for producing Anæsthesia by Freezing."

A new anatomical observation was published by Dr. Bigelow in the same journal, in the year 1875, "Turbinated Corpora Cavernosa." The anatomical expert will recognize at once the analogy hinted at in this designation. The suddenness with which the air passage through the nostrils will become obstructed, and the equal suddenness with which it will be cleared, without the removal of any secretion, might well suggest the idea that some kind of erectile tissue was concerned in this familiar phenomenon. Dr. Bigelow examined the mucous membrane, and detected a spongy tissue with large cells, capable of being rapidly filled with blood and as rapidly emptied, — a structure resembling that of the corpora cavernosa, as the name he gave it implies. This is one of the very few additions to human descriptive anatomy which have been made in this country.

Dr. Bigelow was not a collector of books, nor a great reader. He opened a book as he would open a jackknife, to use it for some special purpose, which having accomplished, he shut it up and had done with it. I may be allowed to quote my own words, as they stand in the report of the memorial meeting held shortly after his decease by the Boston Society for Medical Improvement: —

"He read men and women as great scholars read books. He took life at first hand, and not filtered through alphabets. He was not ashamed of his want of erudition, and would ask questions on matters with which he was unacquainted with the simplicity of a child. But he would get what he wanted out of a book as dexterously, as neatly, as quickly, as a rodent will get the meat of a nut out of its shell. In the address before spoken of, on the use of imagination in science, he handled his rapidly acquired knowledge of the great authors he cited so like an adept in book lore that one might have thought he was

born in an alcove and cradled on a book-shelf. He got what he wanted out of his authority, and the next day the volume he had eviscerated would be kicking about his floor, in the midst of the pamphlets, instruments, and all sorts of learned litter, which half covered his carpet. This power of finding what he wanted in the midst of rubbish he did not want, was hereditary. I remember Dr. James Jackson's saying to me, that, if there was a grain of wheat in a bushel of chaff, Dr. Jacob Bigelow would find it quicker than any man he ever knew."

Though Dr. Bigelow was not as much given to general reading as many less occupied professional men, it is not to be supposed that his active mind could fail to find subjects enough to interest it when not absorbed in some important investigation. He had many tastes and fancies which furnished him abundance of pleasant work, and called forth all his enthusiasm, each special pursuit in its turn. To this one object, whatever it might be, he gave himself enthusiastically for the time. When he had mastered all its details, when he had got at all its secrets, he left it for some new and inviting subject.

At one time he undertook the keeping and raising of fancy pigeons. For this purpose he established a columbarium at the top of his house in Chauncy Place, and showed his fantails and pouters, and other curious varieties, with great satisfaction, until he had learned their ways and become familiarly acquainted with their various graces and accomplishments. At another time his visitor would be startled by a most unceremonious address from a mino bird, to which he had taught certain phrases which could not fail to arrest the attention of his visitor. Another of his pets was a little bird which used to run up his sleeve in the most uncanny way. Between these two familiar spirits, he might well have been hanged as a wizard in the days of witchcraft. At another time he amused himself with the study of the ways of ants, placing the sand for their dwelling between two plates of glass, so that their operations could be observed. Again, he found his recreation in the royal handicraft of the locksmith, and studied the intricate contrivances of Bramah and Hobbs as he has studied the arrangements of the hip joint. With this fondness for animal life it is not strange that he held in great aversion the too frequent abuse of vivisection. I have often heard him express himself very strongly on this subject. I think his longest and strongest fancy was for paintings. He did not care to refer to the fact that he was color-blind, so far as the difference between red and green was concerned. When he was a boy he could not distinguish between the

color of cherries and that of the leaves of the tree. Still, he had a passion for a picture, and spoke with enthusiasm of the color of some that pleased him. A bright patch on an old canvas attracted him in a moment; he would wet his finger and rub off the dust as eagerly as a gold-hunter explores a pebble with shining yellow particles scattered through it. He bought a good many pictures, and it was generally for their color, rather than for any other excellences, so far as my observation has gone. Another of his hobbies, if I may call them so, was the study of agates. He made a large collection of them, and examined some points of their internal formation with great interest.

Dr. Bigelow was not in the habit of speaking of his health, but he suffered at various times from symptoms of different kinds. The earlier pulmonary symptoms, which have been referred to, do not appear to have troubled him after the period of early manhood.

A few years before his death he was thrown from a vehicle, and received a blow on the head, which was followed by what seemed to be an inflammation of some of the membranes of the brain, leading to what he thought and what proved to be some thickening of the dura mater. His fatal illness seemed to be entirely disconnected with the injury referred to. Occasional passages of gall stones, inflammation of the bile ducts extending to the liver, and producing abscesses, with other marks of internal inflammation, inability to take food without extreme suffering, ended in gradual failure of bodily strength, the mind remaining bright and clear to very near the close of life. It was noted, in examination of the brain, that its convolutions presented an unusual complexity, suggesting a greater amount of vesicular matter than is common.

Dr. Bigelow wrote upon various important subjects of a more general nature. In 1871 he delivered an address upon medical education in America, before the Massachusetts Medical Society. In 1880 he wrote a minority report upon the code of ethics adopted by the Medical Society; and in 1889, an article upon fees in hospitals, in which he took strong ground against certain practices alleged to have grown up in some of these institutions. The last paper on the list of his works is entitled, "An Old Portrait of a Surgeon." A painting was presented many years ago to the Society for Medical Improvement, supposed to be a portrait of the great surgeon, Ambroise Paré. The truth of this supposition had been questioned, and remained undecided for thirty or forty years, when Dr. Bigelow thought it was time to settle it authoritatively. For this purpose he instituted the most search-

ing inquiry; had photographs taken of numerous portraits bearing on the question; carried on a correspondence with experts in Europe; and finally established beyond doubt the fact that the portrait was not of Ambroise Paré, but of another practitioner of a certain reputation, but by no means so great a name as the illustrious surgeon's of whom it had been thought to be a likeness.

Dr. Bigelow was, unquestionably, a man of true genius. Sagacity in divining the truth; the power of continuous, patient, and searching investigation; inexorable determination to have the truth, if nature could be forced to yield it, characterized his powerful intelligence. The record of his printed publications is not a very long one, but it is weighty with original thought and practical discovery. He inherited a distinguished name, and his labors have rendered it memorable and illustrious, — one of the brightest in the annals of American surgery, — not to claim for it a still higher place in the history of the healing art.

Dr. Bigelow was married in 1847 to Susan, daughter of the Hon. William Sturgis. She died on June 9, 1853. One son, William Sturgis Bigelow, survives his parents.